

Of totems in App. No. 10/521,060
Amendment dated November 21, 2006
Reply to Office action of August 21, 2006

Amendments to the Claims:

This listing of claims will replace all prior versions, and listings, of claims in the present application.

Listing of Claims:

Claim 1 (currently amended): A method of manufacturing a crystal of a group III-V compound, the method comprising:

a deposition step of depositing a metal film on a substrate;
a heat-treatment step of heat-treating the metal film under an atmosphere in which a metal-film patterning compound is present so that the metal film becomes patterned with a plurality of holes or grooves having an indefinite shape; and
a growth step of growing a group III-V crystal on the post-heat-treated metal film.

Claim 2 (currently amended): A method of manufacturing a crystal of a group III-V compound, the method comprising:

a deposition step of depositing a metal film on a substrate;
a heat-treatment step of heat-treating the metal film under an atmosphere in which a metal-film patterning compound is present so that the metal film becomes patterned with a plurality of holes or grooves having an indefinite shape;
a first growth step of growing a group III-V compound buffer film on the post-heat-treated metal film; and
a second growth step of growing a group III-V crystal on the group III-V compound buffer film.

Claim 3 (currently amended): A group III-V crystal manufacturing method as set forth in claim 1, wherein:

the holes or grooves formed in the metal film in said heat-treatment step have an average width of 2 nm to 5000 nm; and

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the aperture fraction, being the percentage of the surface area that the holes or grooves occupy with respect to the substrate total surface area, is 5% to 80%.

Claim 4 (previously presented): A group III-V crystal manufacturing method as set forth in claim 1, characterized in that the substrate is silicon, sapphire, SiC, ZrB₂, or a group III-V compound.

Claim 5 (previously presented): A group III-V crystal manufacturing method as set forth in claim 1, characterized in that the metal film contains titanium or vanadium.

Claim 6 (previously presented): A group III-V crystal manufacturing method as set forth in claim 1, wherein the method renders the thickness of the metal film to be 10 nm to 100 nm.

Claim 7 (previously presented): A group III-V crystal manufacturing method as set forth in claim 1, characterized in that the heat treatment is carried out at 800°C to 1200°C for 0.5 minutes to 20 minutes.

Claim 8 (previously presented): A group III-V compound crystal manufactured by a group III-V crystal manufacturing method as set forth in claim 1.

Claim 9 (previously presented): A group III-V compound crystal as set forth in claim 8, wherein the group III-V crystal is Ga_xAl_yIn_{1-x-y} (0 ≤ x ≤ 1 and 0 ≤ y ≤ 1).

Claim 10 (currently amended): A group III-V crystal manufacturing method as set forth in claim 2, wherein:

the holes or grooves formed in the metal film in said heat-treatment step have an average width of 2 nm to 5000 nm; and

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the aperture fraction, being the percentage of the surface area that the holes or grooves occupy with respect to the substrate total surface area, is 5% to 80%.

Claim 11 (previously presented): A group III-V crystal manufacturing method as set forth in claim 2, characterized in that the substrate is silicon, sapphire, SiC, ZrB₂, or a group III-V compound.

Claim 12 (previously presented): A group III-V crystal manufacturing method as set forth in claim 2, characterized in that the metal film contains titanium or vanadium.

Claim 13 (previously presented): A group III-V crystal manufacturing method as set forth in claim 2, wherein the method renders the thickness of the metal film to be 10 nm to 100 nm.

Claim 14 (previously presented): A group III-V crystal manufacturing method as set forth in claim 2, characterized in that the heat treatment is carried out at 800°C to 1200°C for 0.5 minutes to 20 minutes.

Claim 15 (previously presented): A group III-V compound crystal manufactured by a group III-V crystal manufacturing method as set forth in claim 2.

Claim 16 (previously presented): A group III-V compound crystal as set forth in claim 15, wherein the group III-V crystal is Ga_xAl_yIn_{1-x-y} ($0 \leq x \leq 1$ and $0 \leq y \leq 1$).